RUPTURE DISCS

The function of a Rupture Disc is to protect against over-pressure. For safety reasons, excessive over-pressure in any part of the refrigeration system must be avoided. A rupture disc is generally used in combination with a Henry Technologies pressure relief valve.

Applications

A rupture disc protects against any leakage or weeping of refrigerant through a relief valve. A rupture disc can also be used in combination with a pressure gauge and/or pressure switch to detect if a relief valve has discharged.

Henry Technologies rupture discs are designed to operate with gases and should not be used to prevent liquid over-pressure.

The brass 55 series models are suitable for use with HCFC and HFC refrigerant gases. The stainless steel 56 series models are also suitable for ammonia.

In line with the Institute of Refrigeration Guidelines (UK), it is recommended that at least every 2 years all high side bursting discs should be replaced. At least every 5 years all low side bursting discs should be replaced. These intervals may have to be reduced if other regulations apply.

How it works

A foil disc is clamped in a holder. The disc is designed to burst at a pre-determined pressure - the set pressure. A reverse acting disc is used. This means that the disc is domed against the direction of the fluid pressure and designed to buckle due to compression forces, prior to bursting. Advantages of a reverse acting disc include being less sensitive to temperature, high operating pressures and improved fatigue life. Each disc is manufactured with a precision score mark. This score mark in combination with the buckling action causes the disc to burst. At burst, the disc is designed to hinge resulting in a large available flow area. The disc is designed to be non-fragmenting after rupturing.

Main features

- Proven safe design
- Dual Coded - ASME & CE
- High flow capacity
- Compact
- Reverse acting, non-fragmenting disc
- 2 x 1/8 NPT pressure ports
- Helium leak tested
- Non-standard pressure settings available on request

Technical Specification

Set pressure range = 10.3 to 31 barg
Allowable operating temperature = -40°C to +107°C

Materials of Construction

For 55 and 56 series, the main bodies are made from brass and stainless steel respectively.

The foil disc is made from Nickel alloy.

Rupture Disc manufacturing range @ 22°C	
Pressure setting (barg)	Pressure range (barg)
10.3	9.8 - 10.8
14	13.3 - 14.7
16.2	15.4 - 17.0
17.2	16.3 - 18.0
20.7	19.7 - 21.7
24.1	22.9 - 25.3
24.8	23.6 - 26.0
27.6	26.2 - 29.0
31	29.5 - 32.6

Part No	Conn Size (inch)		Dimensions (mm)					Rupture disc setting at 22°C (barg)	Weight (kg)	CE Cat
	Inlet	Outlet	A	B	ØC	D	MNFA, mm² (note 1)			
5525-16.2 Bar-CE	3/8 MPT	3/8 FPT	65	31.8 A/F	9.7	20	64.5	16.2	0.28	Cat IV
5525-20.7 Bar-CE								20.7		
5525-24.1 Bar-CE								24.1		
5525-27.6 Bar-CE								27.6		
5525-31.0 Bar-CE								31.0		
5526-14.0 Bar-CE	1/2 MPT	1/2 FPT	73	31.8 A/F	12.7	23	109.7	14.0	0.30	Cat IV
5526-16.2 Bar-CE								16.2		
5526-20.7 Bar-CE								20.7		
5526-24.1 Bar-CE								24.1		
5526-24.8 Bar-CE								24.8		
5526-27.6 Bar-CE								27.6		
5526-31.0 Bar-CE								31.0		
5626-10.3 Bar-CE	1/2 MPT	1/2 FPT	73	Ø28.6	12.7	23	109.7	10.3	0.20	Cat IV
5626-17.2 Bar-CE								17.2		
5626-20.7 Bar-CE								20.7		
5627-10.3 Bar-CE	3/4 MPT	3/4 FPT	81	Ø38.1	19	29	187.1	10.3	0.34	Cat IV
5627-17.2 Bar-CE								17.2		
5627-20.7 Bar-CE								20.7		
5628-10.3 Bar-CE	1MPT	1FPT	93	Ø44.5	25.5	32	335.5	10.3	0.56	Cat IV
5628-17.2 Bar-CE								17.2		
5628-20.7 Bar-CE								20.7		
5629-10.3 Bar-CE	1 1/4 MPT	1 1/4 FPT	95	50.8 A/F	33.3	33	683.9	10.3	0.76	Cat IV
5629-17.2 Bar-CE								17.2		
5629-20.7 Bar-CE								20.7		

Note 1: MNFA = Minimum net flow area. The MNFA is the net area after a complete disc burst, taking into account any structural members which reduce the nominal flow area. MNFA should be used as the flow area, A, in flow capacity calculations

Selection Guidelines

1. The rupture disc pressure setting should be the same as the Henry Technologies pressure relief valve setting.
2. The stamped burst pressure is subject to a manufacturing tolerance of +/-5 %. This tolerance should be taken into account when specifying a rupture disc setting (refer to table).
3. The burst pressure is affected by operating fluid temperature. Refer to table for temperature adjustment factors. At higher operating temperatures the disc burst pressure is reduced while at sub-zero temperatures it is increased. This factor should be taken into account when specifying a rupture disc setting.

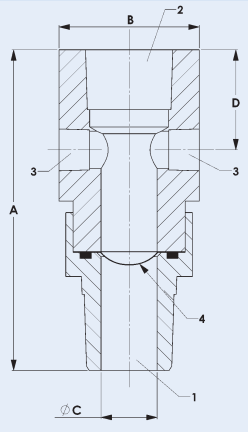
Temperature range, °C	Temperature adjustment factor
-40 to -18	1.05
-17 to -1	1.04
0 to +45	1
+46 to +80	0.98
+81 to +107	0.97

4. It is recommended that the maximum operating pressure of the system is no more than 80% of the stamped burst pressure, in order to minimise the risk of premature fatigue failure of the disc. If operating pressures exceed 90% of the stamped burst pressure, the disc should be replaced immediately.
5. The design fatigue strength of each disc is 100,000 pressure cycles. Fatigue life will be reduced by excessive pressures or temperatures, corrosion, damage, etc.

Example

Rupture disc stamped setting = 31 barg @ 22°C
Minimum actual burst pressure, using manufacturing tolerance = 0.95 x 31 = 29.45 barg
Maximum actual burst pressure, using manufacturing tolerance = 1.05 x 31 = 32.55 barg

Maximum operating fluid temperature = 40°C



1. Inlet
2. Outlet
3. Gauge port, 1/8 NPT
4. Rupture disc

To determine the recommended maximum operating pressure, the user should consider the -5% manufacturing tolerance and the de-rate factors for both temperature and fatigue life.

Therefore:-

Minimum actual burst pressure = 29.45 barg
Temperature de-rate factor = 1.0
Fatigue life de-rate factor = 0.8

Recommended maximum operating pressure for rupture disc = 29.45 x 1.0 x 0.8 = 23.6 barg.

Installation – Main Issues

1. Connect the rupture disc either directly to the pressure vessel or to a three-way valve above the liquid refrigerant level in the vapor space.
2. The rupture disc comprises of a two-piece body design. To avoid damage during assembly or removal, the product Installation Instructions must be followed.
3. The pipework must not impose loads on the rupture disc. Loads can occur due to misalignment, thermal expansion, discharge gas thrust, etc.